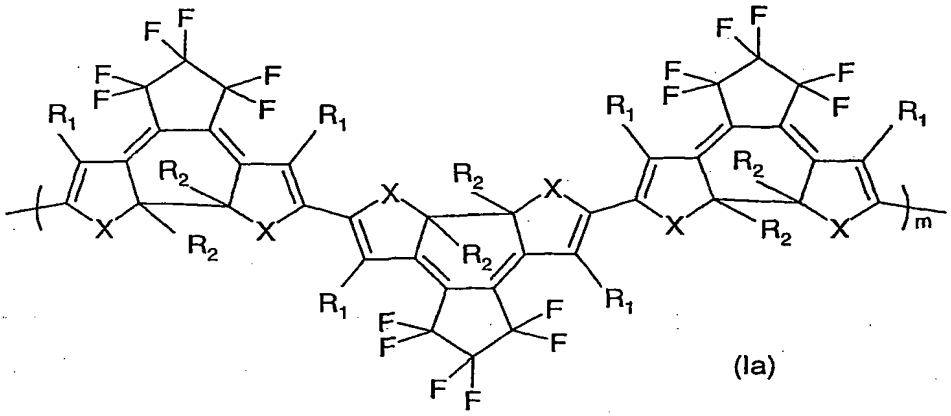
CLAIMS

1) An optical waveguide comprising a matrix and an optical path including a photochromic diarylethene polymer having the general formula (Ia)



(Ia)

wherein

X is S, O, Se, Te, or N-R, wherein R is hydrogen or a linear or branched (C_{1-12})alkyl group;

R_1 is hydrogen, a linear or branched (C_{1-12})alkyl or (C_{1-12})alkoxy group;

R_2 is a linear or branched (C_{1-12})alkyl group; and

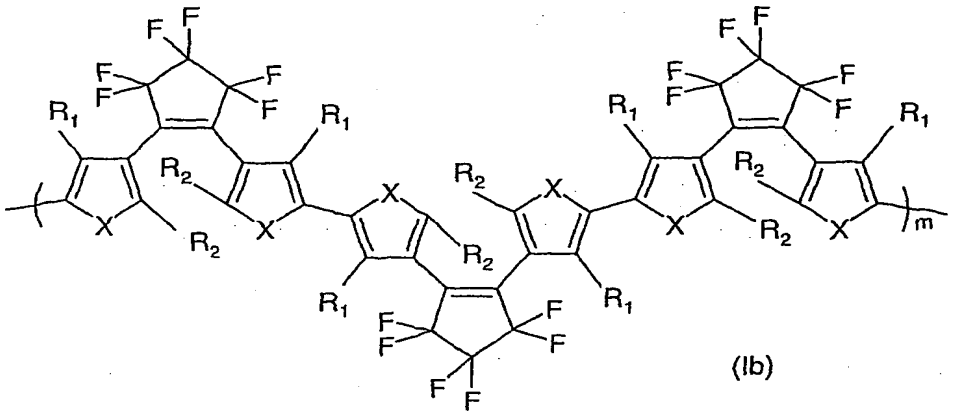
m = 4-100.

2) An optical waveguide according to claim 1 wherein X is S, Se or Te.

3) An optical waveguide according to claim 2 wherein X is S.

4) An optical waveguide according to claim 1 wherein R_1 is hydrogen or a (C_{1-3})alkyl group.

5) An optical waveguide according to claim 1 wherein the optical path is surrounded by a matrix comprising a photochromic diarylethene polymer having the general formula (Ib)



(Ib)

wherein X, R_1, R_2 and m are according to any of the preceding claims.

6) An optical waveguide according to claim 1 wherein said photochromic diarylethene polymer is dispersed in said matrix.

7) An optical waveguide according to claim 1 wherein said matrix is selected from polystyrene, polymethylmethacrylate (PMMA), polycarbonate, polysulphone, polyimide, fluorinated or deuterated PMMA, and mixtures thereof

8) Method for the preparation of an optical waveguide comprising the steps of

a) dissolving a photochromic diarylethene polymer of formula (Ib) as from the preceding claims, in an organic solvent;

b) mixing the thus obtained solution and a polymeric matrix until a dispersion is obtained;

c) preparing a film by depositing said dispersion on a substrate;

d) irradiating said film, so as to form an optical path comprising a photochromic diarylethene polymer of formula (Ia) as from the preceding claims.

9) Method according to claim 8 wherein the organic solvent is a chlorinated solvent.

10) Method according to claim 8 wherein the photochromic diarylethene polymer of the invention is dissolved in said matrix at a con-

centration not higher than 20% by weight.

11) Method according to claim 10 wherein said concentration ranges between 0.1% and 15% by weight.

12) Method according to claim 11 wherein the concentration ranges between about 5 and about 10% by weight.